CONTOUR CUTTING WITH OPOS for the SC

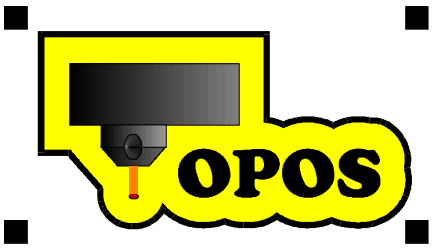


TABLE OF CONTENTS

1 INTRODUCTION 2
2 POSSIBLE COMPENSATIONS BY OPOS 2
2.1 MISALIGNED MEDIA 2
2.2 SKEWED GRAPHIC 2
2.3 INCORRECTLY SCALED GRAPHIC 3
3 CREATING A GRAPHIC 4
4 INSERTING THE MARKERS 5
5 PRINTING THE GRAPHIC 7
6 LOADING THE MEDIA IN THE CUTTER 8
7 SETTING SPECIAL LOAD AND THE OPOS PARAMETERS 9
7.1 USING SUMMA CUTTER CONTROL 9
7.2 USING THE CUTTER'S CONTROL PANEL 10
8 REGISTERING THE MARKERS 14
9 CUTTING THE CONTOUR 15
10 AUTOMATING TASKS WITH OPOS 17
10.1 CUTTING MULTIPLE COPIES OF A GRAPHIC ON THE SAME MEDIA ROLL ... 17
10.2 CUTTING THE SAME GRAPHIC ON MULTIPLE MEDIA SHEETS 18
11 CALIBRATING THE SYSTEM 22
11.1 OPOS CALIBRATION 22
11.2 MEDIA CALIBRATION 23

1 INTRODUCTION

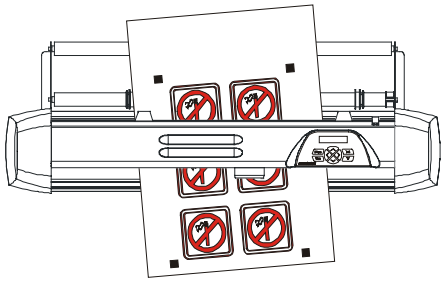
The Optical Positioning System (OPOS) ensures precise contour cutting and Can only be factory installed a SummaCut Series cutter. OPOS is able to provide this capability by registering black markers that are printed along the outside of the graphic. A sensor that is mounted at the bottom of the cutter's head carries out marker registration. Because of this registration process, OPOS can determine the exact position of the printed graphic.

2 POSSIBLE COMPENSATIONS BY OPOS

OPOS can compensate for any combination of the following three errors:

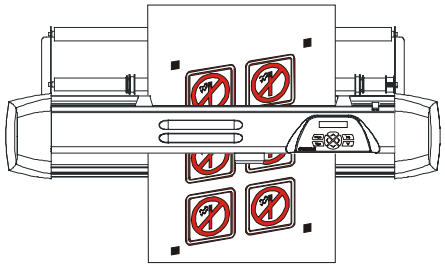
2.1 MISALIGNED MEDIA

OPOS will rotate the cut contour to match the graphic's contour in the event the media is not loaded evenly into the cutter.



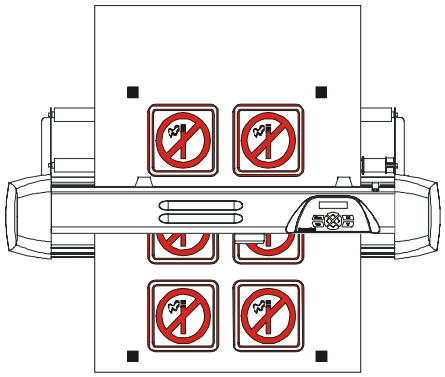
2.2 SKEWED GRAPHIC

If the X and Y Axes of the printed graphic are not perpendicular, the cut contour can be skewed to fit the printed graphic.



2.3 INCORRECTLY SCALED GRAPHIC

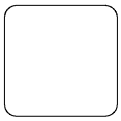
If the printed graphic differs in size from the graphic as it appears in your software due to media expansion, media shrinkage, or printing inaccuracies, the cut contour can be scaled to fit the printed graphic. The scale can only be adjusted by a few percentage points.



3 CREATING A GRAPHIC

1. Use your graphics software to create the graphic you want to print and cut.

2. Create a cut contour around the graphic.



HINT: Create the cut contour as a separate layer and assign it a unique color. This way it will be easy to differentiate between the graphic and its contour. The documentation supplied with your graphics software should provide additional instruction about creating cut contours.

HINT: Leave some space between the graphic's contour and the cut contour. This way the difference will be less noticeable should the graphic shift slightly during cutting.

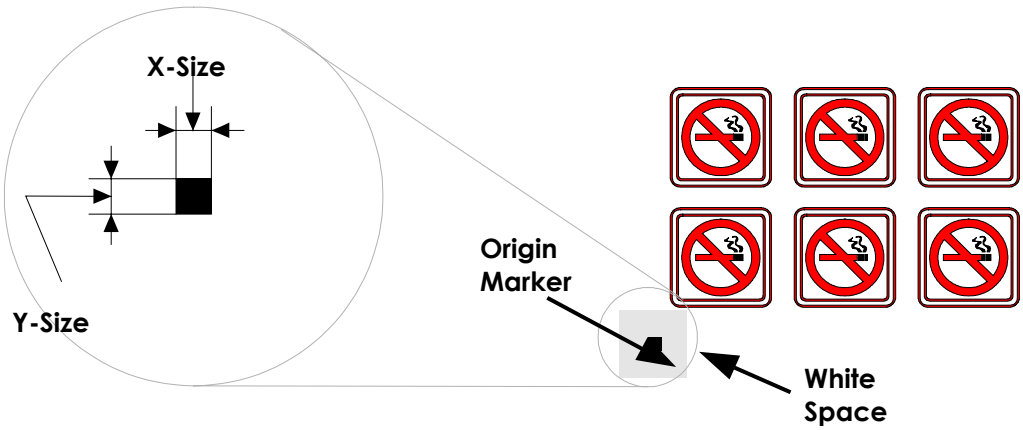
3. If necessary, make additional copies of both the graphic and its associated contour.

4. Proceed to Section 4, "Inserting the Markers."

4 INSERTING THE MARKERS

1. Insert a marker to represent the Origin. The marker must be a black square. Each of the marker's four sides should measure 3mm but must not be less than 1.2mm or more than 10mm.

HINT: Create all the markers on a separate layer for easier handling.



NOTE: When printing on small media sheets, use smaller markers to minimize waste of material.

2. Set the line style of the marker to **None**. Line styles of varying thicknesses can alter the size of the markers.

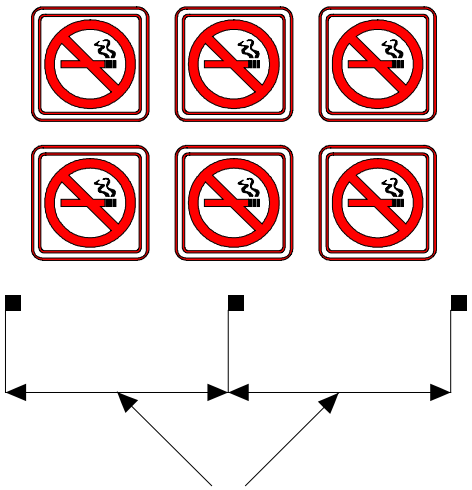
3. Make sure there is a white margin of about 3 - 4 times the marker size around the marker. If anything is printed within this margin, the sensor may be unable to locate the marker.

4. Make sure that the Origin marker is situated below and to the left of all contours to be cut.

HINT: Manually place an identifying mark on the media to indicate which marker is the Origin. This will be helpful when the printed graphic needs to be loaded into the cutter.

5. Insert a horizontally aligned copie of the Origin marker at a known interval (X-Distance). Make sure there is enough white space around each marker.

The X-Distance is the distance from the lower left corner of one marker to the lower left corner of the next marker and depends on several factors. Normally, 20cm is an appropriate distance. But, if the marker size is less than 3x3mm, the X-Distance should be decreased. *The X-Distance must be known when setting the OPOS parameters.*

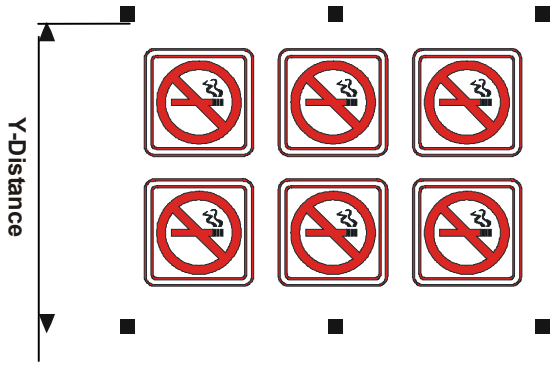


X-Distance

NOTE: OPOS will operate faster as the X-Distance increases. Conversely, OPOS will operate more accurately as the X-Distance decreases, however this impact on accuracy is minimal.

6. Make a copy of the row of markers created in step 5. Place this new row above the graphic to indicate the Y-Axis.

The Y-Distance is the distance from the bottom of one marker to the bottom of the next marker along the Y-Axis. *The Y-Distance must be known when setting the OPOS parameters.*



CAUTION: The exact distance between any two markers along the X-Axis or Y-Axis must be established. Measure this distance in the design software, not on the media!

7. Save the graphics, contours, and markers as one file. This is the file that will be sent to the printer .

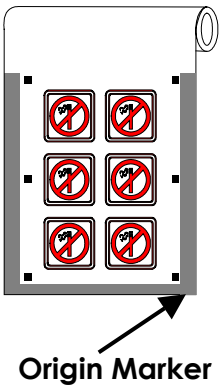
8. Copy the graphics, contours, and markers and paste them into a new file.

9. Delete the graphics so that only the contours and markers are left. Save this as a separate file. This is the file that will be sent to the cutter.

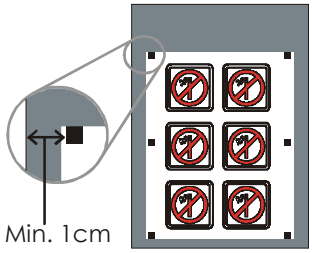
10 Proceed to Section 5, "Printing the Graphic."

5 PRINTING THE GRAPHIC

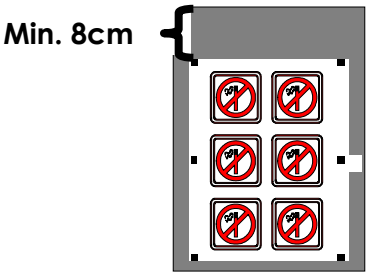
1. Print the graphic and its markers with a printer (scale = 100%). When printing on a roll, make sure that the graphic's Origin marker coincides with the media's origin.



2. Make sure there is *at least* a 1cm (0.4in) between the marker and the media border. A 2cm (0.8in) margin is preferable.



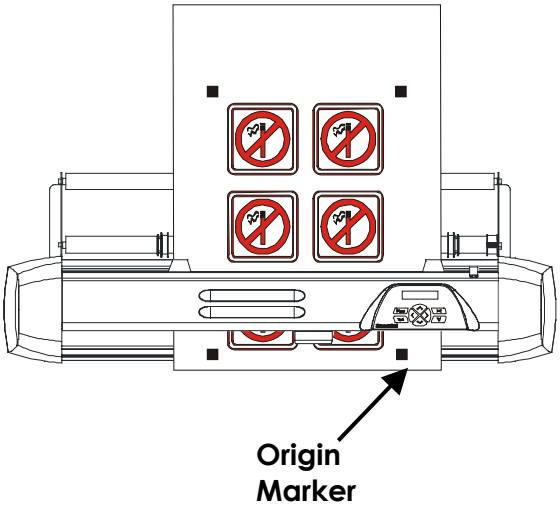
3. Leave a margin of at least 8cm (3.15in) following the print when using sheets or when cutting the print off a roll.



4. Proceed to Section 6, "Loading the Cutter."

6 LOADING THE MEDIA IN THE CUTTER

1. Load the printout into the cutter as described in section 1.7 . Make sure that the marker indicating the Origin is situated at the bottom right corner of the cutter.



7 SETTING SPECIAL LOAD AND THE OPOS PARAMETERS

The Special Load setting determines whether the cutter uses OPOS, or one of the three manual alignment methods, for contour navigation.

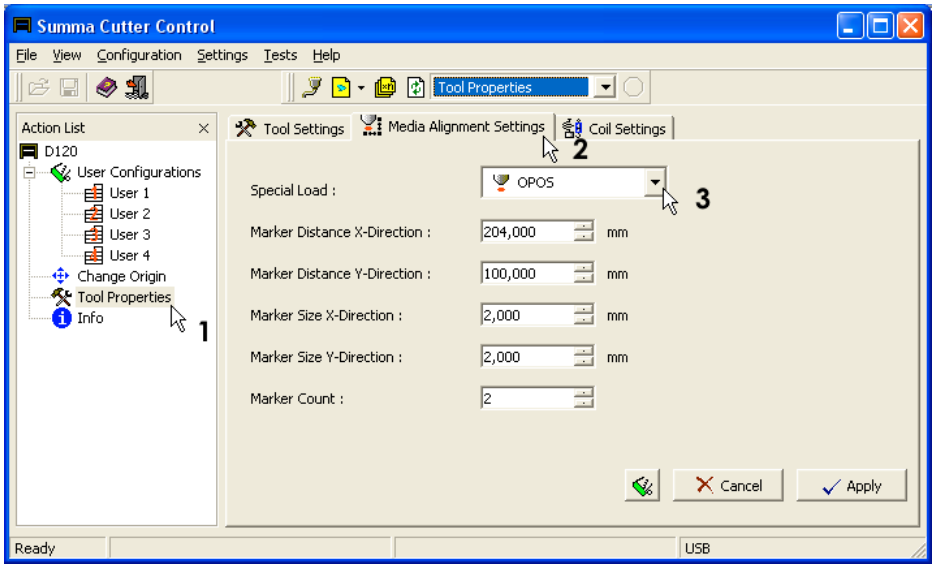
The OPOS parameters are variables that define the distance, size, and number of markers.

The Special Load setting and the OPOS parameters can be set using either Summa Cutter Control or the cutter's control panel.

7.1 USING SUMMA CUTTER CONTROL

1. Open Summa Cutter Control.

2. Select **Tool Properties** in the **Action List (1)** and select the **Media Alignment Settings** tab (2). If necessary, change the **Special Load** setting to **OPOS** using the drop-down box (3).



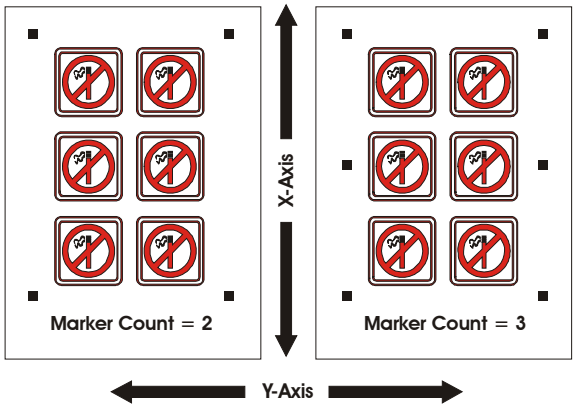
3. Enter the value for the **X-Distance**. X-Distance is the distance between the two markers along the X-Axis (1).

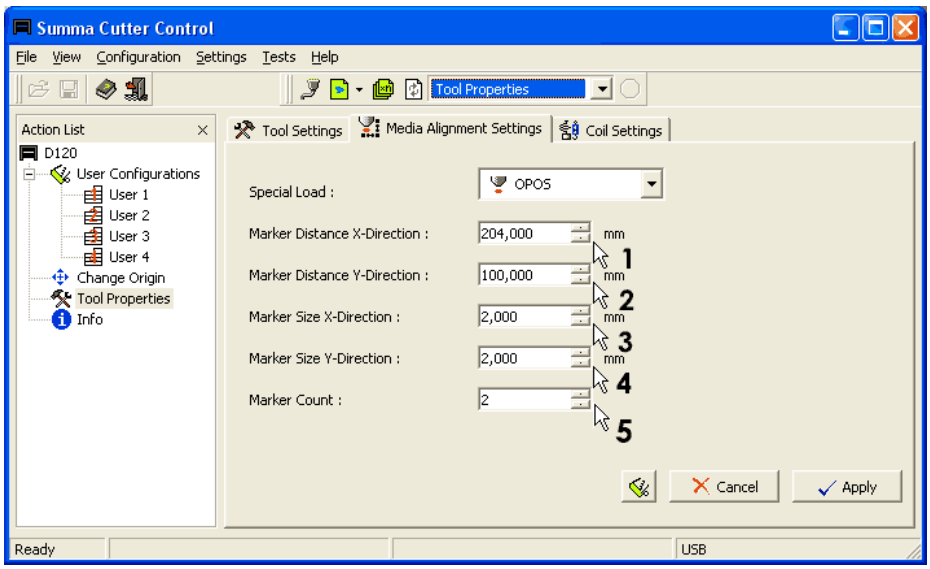
4. Enter the value for the **Y-Distance**. Y-Distance is the distance between the two markers along the Y-Axis (2).

5. Enter the **X-Size** for the markers. X-Size is the length of one side of a registration marker along its X-Axis (3).

6. Enter the **Y-Size** for the markers. Y-Size is the length of one side of a registration marker along its Y-Axis (4).

7. Enter the **Marker Count**. Marker Count is the number of markers in one of the two rows along the X-Axis, not the number in both rows added together. (5)





8. Click **Apply**.

8. Proceed to Section 8, "Registering the Markers."

7.2 USING THE CUTTER'S CONTROL PANEL

1. Press the Menu, then press ⌄ repeatedly until **SYSTEM SETUP** is displayed.

2. Press ⌄. **CONFIDENCE** will appear on the LCD.

3. Press ⌄ repeatedly until **ALIGN MODE** is displayed. Press ⌄.

If the LCD displays ∗**OPOS**, proceed to step 4 because **SPECIAL LOAD** is already set to **OPOS**.

If the LCD displays ∗**X ALIGN**, ∗**XY ALIGN**, or **XY ADJUST**, complete the following two steps.

1) Press > repeatedly to modify **SPECIAL LOAD** so that the LCD displays **OPOS.**

2) Press v to enter the selection. An asterisk (∗) will be displayed to indicate that the new setting has been entered. Changing the setting without pressing v ↵ will cause the parameter to revert to its previous setting.

4. Press x to return to **ALIGN MODE** screen.

5. Press ⌄ repeatedly until **OPOS SETTINGS** appears on the LCD.

6. Press v. **X-Distance** will appear on the LCD.

X-Distance is the distance between two markers along the X-Axis.

7. Press v. If necessary, press either < or > until the desired distance is displayed. Pressing these keys repeatedly will decrease or increase the distance in increments of 1 millimeter. Press and hold either key to scroll rapidly.

8. If the setting was changed in step 7, press v. An asterisk (∗) will be displayed to indicate that the new value has been entered. Changing the setting without pressing v will cause the parameter to revert to its previous setting.

9. Press x once. Then press ⌄. **Y-Distance** r will appear on the LCD.

Y-Distance is the distance between two markers along the Y-Axis.

10. Press v. If necessary, press either < or > until the desired distance is displayed. Pressing these keys repeatedly will decrease or increase the distance in increments of 1 millimeter. Press and hold either key to scroll rapidly.

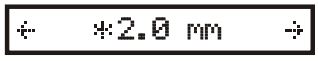
11. If the setting was changed in step 10, press v. An asterisk (*) will be displayed to indicate that the new value has been entered. Changing the setting without pressing v will cause the parameter to revert to its previous setting.

12. Press x once. Then press v. **X-Size** will appear on the LCD.

X-Size is the length of one side of a registration marker along its X-Axis.

13. Press v. If necessary, press either < or > until the desired length is displayed. Pressing these keys repeatedly will decrease or increase the length in increments of ½ of a millimeter. Press and hold either key to scroll rapidly.

14. If the setting was changed in step 13, press v. An asterisk (*) will be displayed to indicate that the new value has been entered. Changing the setting without pressing v will cause the parameter to revert to its previous setting.



15. Press x once. Then press v. **Y-Size** will appear on the LCD.

Y-Size is the length of one side of a registration marker along its Y-Axis.

16. Press v. If necessary, press either < or > until the desired length is displayed. Pressing these keys repeatedly will decrease or increase the length in increments of ½ of a millimeter. Press and hold either key to scroll rapidly.

17. If the setting was changed in step 16, press . An asterisk (*) will be displayed to indicate that the new value has been entered. Changing the setting without pressing will cause the parameter to revert to its previous setting.

18. Press once. Then press . **Marker count** will appear on the LCD. **Marker Count** is the number of markers in one of the two rows along the X-Axis (not the number in both rows added together).

19. Press . If necessary, press either or until the desired **Marker Count** is displayed. Pressing these keys repeatedly will decrease or increase the **Marker Count** one marker at a time. Press and hold either key to scroll rapidly.

14. If the setting was changed in step 19, press . An asterisk (*) will be displayed to indicate that the new value has been entered. Changing the setting without pressing will cause the parameter to revert to its previous setting.

18. Press repeatedly until the cutter is online again.

19. Proceed to Section 8, "Registering the Markers."

8 REGISTERING THE MARKERS

1. Before proceeding, make sure that all cutting parameters, such as pressure and velocity, are correct. (See the SummaCut User's Manual for more information.)

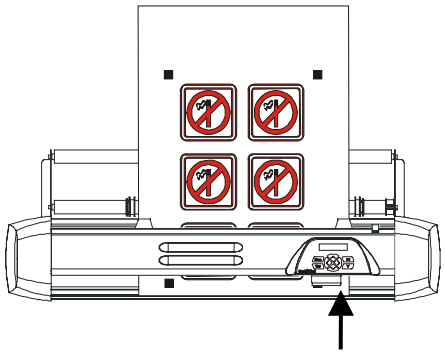
2. Press the Menu, then press repeatedly until **ALIGN LOAD** is displayed.

3. Press . The following message will be scrolled

<<<SET SENSOR ABOVE FIRST MARKER<<<

4. Lower the OPOS sensor into the read position. Turn the metallic knob located on the lower side of the head in a clockwise direction.

5. Position the sensor ( ) directly above the Origin marker using , , , and .



The sensor must be directly over the Origin marker.

6. Press to enter the Origin's location into the cutter's memory. The cutter will scan the remaining markers and then return to the **ONLINE** screen.

If an error occurs, the following message will scroll on the LCD:

<<<ERROR: MARKERS NOT SENSED PROPERLY PRESS ANY KEY<<<

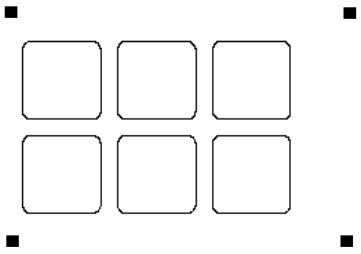
If this message is displayed, press **1** and the cutter will return to **ONLINE** status. Repeat steps 2 – 6.

7. Proceed to Section 9, "Cutting the Contour."

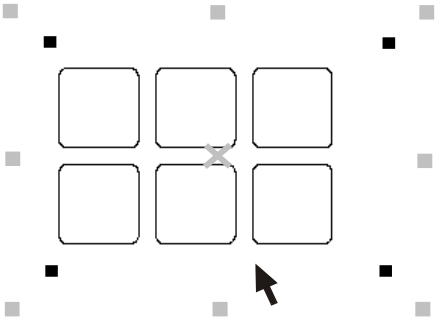
9 CUTTING THE CONTOUR

Follow the specific instructions for contour cutting provided in your software's documentation. If such instructions are not available, perform the following steps:

1. Using your graphics software, open the file created in step 12 in the "Inserting the Markers" section. This file should contain the graphic's contours and registration markers, but not the graphic itself.



2. Use the mouse pointer to click and "select" the contours and registration markers.



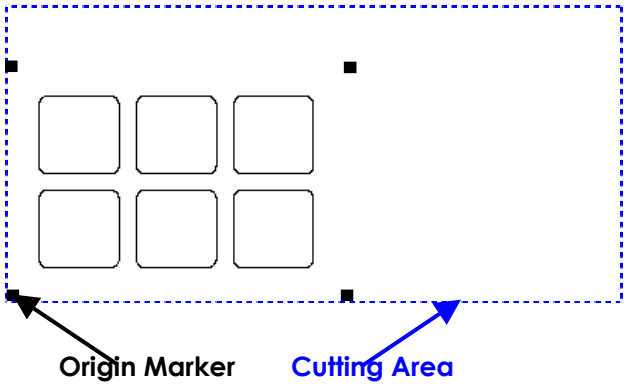
3. Move the graphic's contours and registration markers from the design software into the cutting software.

This step is usually accomplished by pressing a **Cut** button that is anchored inside one of the design software toolbars. A unique icon or the name of the cutting software usually identifies this button.

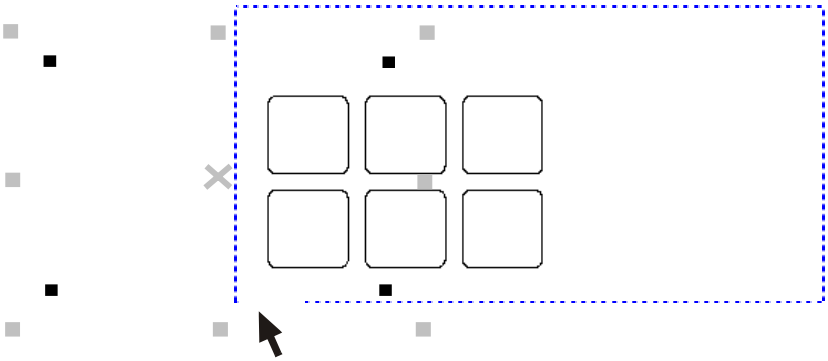
If a **Cut** button cannot be found, click **File** in the design software and check for a **Cut** or **Send to Cutter** option.

If a cut command still cannot be located, the cutting software may need to be linked to the design software. (See the documentation that came with both the design and cutting software.)

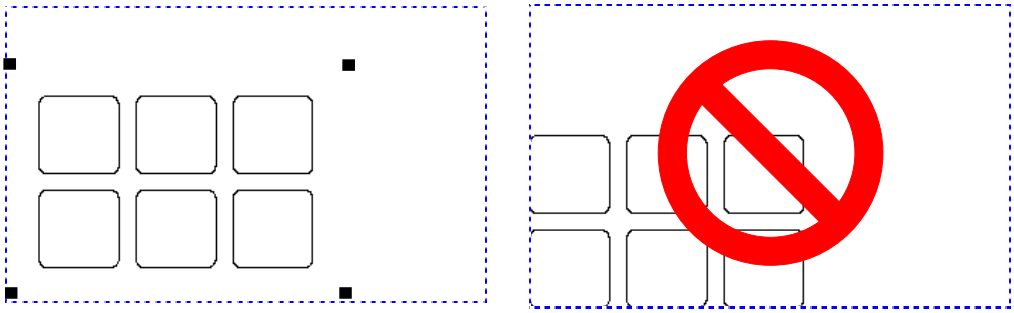
4. Once inside the cutting software, it may be necessary to collectively rotate the contours and markers so that the Origin marker is situated in the bottom left corner of the cutting area as viewed on the screen. If your cutting software's default orientation is not set to "landscape," the contours and markers will need to be rotated.



5. Use the mouse pointer to click and "select" the contours and registration markers.



HINT: Some software will shift the selected contours to the Origin when cutting. This can be avoided by adding a small rectangular spacer that has its bottom left corner in the Origin. Select this rectangle along with the contours.



6. Make sure that the cutter is connected to the computer and that the cutter is turned on. The cutter's LCD should indicate that the cutter is **ONLINE**.

7. Click **Cut** from within the cutting software. The cutter should begin cutting the contour and return to **ONLINE** status when finished.

NOTE: Make sure that only the contours are cut.

10 AUTOMATING TASKS WITH OPOS

OPOS allows the user to automate certain tasks thereby reducing user intervention and production time. When cutting multiple graphics, the user only needs to maneuver the OPOS sensor above the Origin marker of the first graphic; cutting subsequent graphics does not require additional user input.

Before using the automating features, note the amount of your cutter's RAM as indicated on the LCD upon startup. If the cutter's RAM is *greater* than the job's file size, then the automating features may be used. If the cutter's RAM is *less* than the job's file size, then the automating features may not be used unless your software supports large file cutting.

There are two multiple-job situations in which OPOS can be used:

- When cutting multiple copies of a graphic on the same media roll
- When cutting the same graphic on multiple media sheets

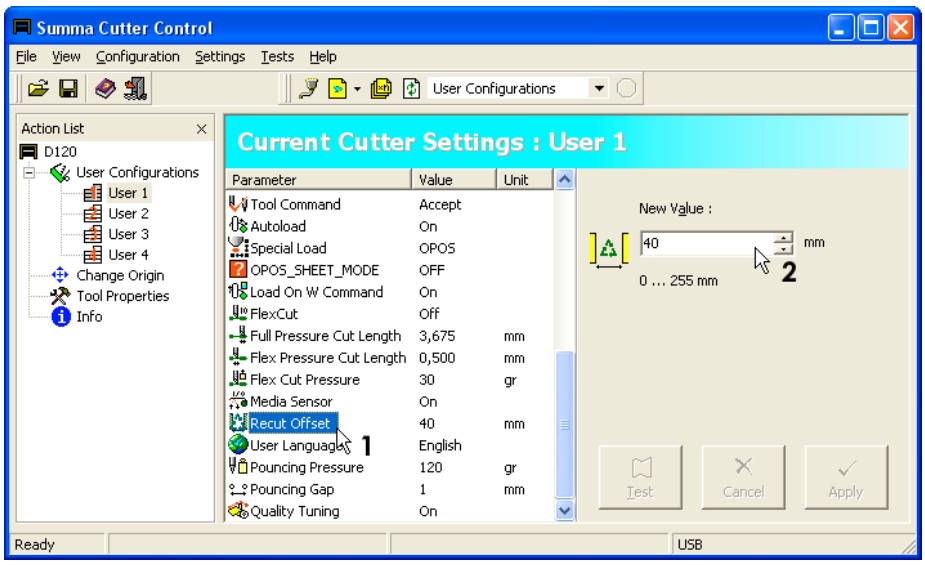
Using OPOS to cut repetitively is explained in greater detail in sections 11, "Cutting Multiple Copies of a Graphic on the Same Media Roll," and 12, "Cutting the Same Graphic on Multiple Media Sheets."

10.1 CUTTING MULTIPLE COPIES OF A GRAPHIC ON THE SAME MEDIA ROLL

1. Load the media into the cutter. (See Section 6, "Loading the Cutter.")

2. Set Special Load and the OPOS parameters in Summa Cutter Control. (See Section 7, "Setting Special Load and the OPOS Parameters.")

3. Select the **RECUT_OFFSET** parameter.



4. Set the **RECUT_OFFSET** parameter in the **New Value** window to equal the distance between the last marker on the first graphic and the first marker on the next graphic. This setting reflects the distance between two graphics.

5. Click **Apply**.

6. Register the markers. (See Section 8, "Registering the Markers.")

7. Cut the first contour. (See Section 9, "Cutting the Contour.")

8. The cutter will stop after the first contour has been cut and the **ONLINE** screen will be displayed.

9. Press the Menu, then press ⌄ repeatedly until **RECUT** is displayed.

10. Press the Menu, then press ‹ or › until the desired number of recuts is displayed. For example, to recut the contour 8 times, press › until **8** appears below **RECUT**.

11. Press ⌄. OPOS will sense the markers for the second contour and then cut that contour. This process of sensing and cutting will repeat automatically until all remaining contours have been cut.

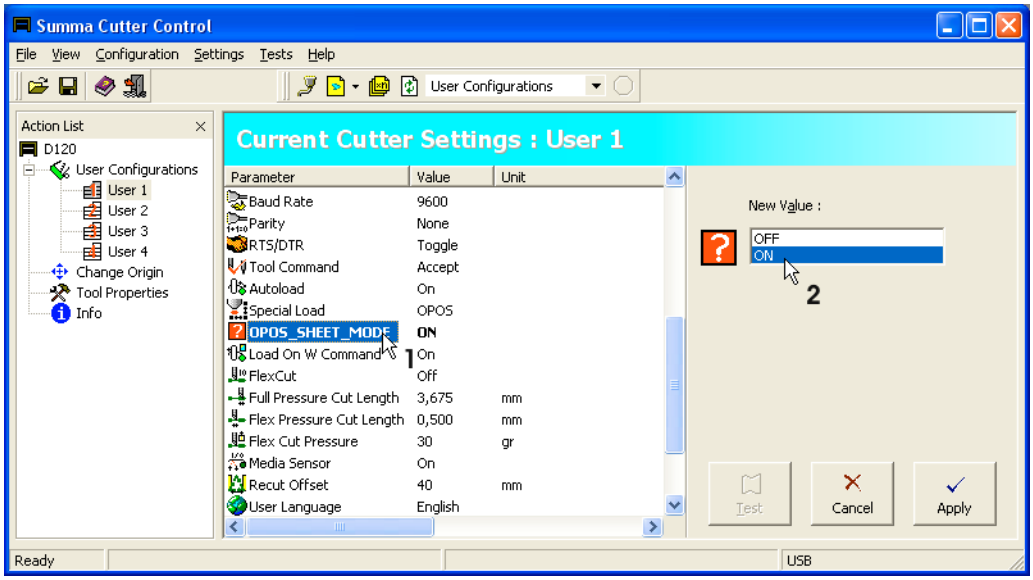
10.2 CUTTING THE SAME GRAPHIC ON MULTIPLE MEDIA SHEETS

10.2.1 USING SUMMA CUTTER CONTROL

Use the following procedure when cutting the same graphic on multiple sheets:

1. Load the first sheet into the cutter. (See Section 6, "Loading the Cutter.")

2. Set Special Load and the OPOS parameters in Summa Cutter Control. (See Section 7, "Setting Special Load and the OPOS Parameters.")



3. Select the **OPOS_SHEET_MODE** parameter. Set **OPOS_SHEET_MODE** to **ON** in the **New Value** window.

4. Click **Apply**.

5. Register the markers. (See Section 8, "Registering the Markers".) The cutter's LCD will indicate that it is ready to cut the first sheet.

6. Cut the first contour. (See Section 9, "Cutting the Contour.")

7. Raise the cam rollers and manually remove the sheet.

8. Insert the next sheet into the cutter. Situate the sheet in the same place as the first sheet.

9. Lower the cam rollers while holding the sheet in place. OPOS will sense the markers and cutting will resume. Repeat steps 7 - 9 until all sheets have been cut.

10. To exit **OPOS_SHEET_MODE**, press the Menu, then press repeatedly until **RECUT** is displayed.

11. Press .

NOTE: If the cutter is turned off and then back on while OPOS_SHEET_MODE is set to ON, OPOS_SHEET_MODE will be set to OFF. This change will not be reflected in the OPOS_SHEET_MODE parameter in Summa Cutter Control. Therefore, Summa Cutter Control must be refreshed by clicking **View** and then **Refresh**. The OPOS_SHEET_MODE parameter will be set to OFF. Sheet cutting can then be resumed by repeating steps 1 - 9.

10.2.2 USING THE CUTTER'S CONTROL PANEL

Use the following procedure when cutting the same graphic on multiple sheets:

1. Load the first sheet into the cutter. (See Section 6, "Loading the Cutter.")

2. Set Special Load and the OPOS parameters using the cutter's control panel. (See Section 7, "Setting Special Load and the OPOS Parameters.")

3. Press the Menu, then press repeatedly until **SYSTEM SETUP** is displayed.

4. Press . **CONFIDENCE** will appear on the LCD.

10. 5. Press repeatedly until **OPOS SETTINGS** appears on the LCD.

11. Press . **X-Distance** will appear on the LCD.

6. Press until **SHEET MODE** appears on the LCD.

7. Press, then once. **ON** will appear on the LCD.

8. Press . An asterisk (*) will be displayed to indicate that the new setting has been entered. Changing the setting without pressing will cause the parameter to revert to its previous setting.

8. Press three times to return to the **ONLINE** screen.

9. Register the markers. (See Section 8, "Registering the Markers".) The cutter's LCD will indicate that it is ready to cut the first sheet.

10. Cut the first contour. (See Section 9, "Cutting the Contour.")

11. Raise the cam rollers and manually remove the sheet.

12. Insert the next sheet into the cutter. Situate the sheet in the same place as the first sheet.

13. Lower the cam rollers while holding the sheet in place. OPOS will sense the markers and cutting will resume. Repeat steps 7 - 9 until all sheets have been cut.

14. To exit **OPOS_SHEET_MODE**, press the Menu, then press repeatedly until **RECUT** is displayed.

11. Press V.

11 CALIBRATING THE SYSTEM

The OPOS system has two calibration procedures:

- OPOS calibration
- Media calibration

NOTE: Both of these procedures must be performed to ensure that OPOS will operate with maximum accuracy.

11.1 OPOS CALIBRATION

OPOS calibration measures the exact distance between the knife tip and the sensor. Perform the following steps to calibrate OPOS:

1. Turn on the cutter and load black vinyl with white backing. The load procedure is described in the User's Manual.

NOTE: Black vinyl with white backing MUST be used when calibrating OPOS.

2. Set the head's origin above a clean, blank part of the vinyl. Defining the origin is described in the SummaCut User's Manual.

3. Press the Menu, then press ⌄ repeatedly until **SYSTEM SETUP** is displayed.

4. Press ⌄. **CONFIDENCE** will appear on the LCD.

5. Press ⌄ repeatedly until **CAL OPOS** appears on the LCD.

5. Press ⌄. The cutter will cut out a square measuring approximately 9.5x9.5mm. **WEED RECTANGLE** will appear on the display.

6. Use tweezers to carefully remove the square from the backing. This process is called "weeding."

7. Press [v]. OPOS will read the size of the square and calibrate itself accordingly. **CAL. OPOS** is again displayed.

8. Press [x] three times to return to the **ONLINE** screen.

NOTE: Subsequent calibrations may be necessary if the contour shifts during cutting.

11.2 MEDIA CALIBRATION

Media calibration ensures that the sensor is able to recognize the markers. OPOS is calibrated at the factory to work on a wide range of media. However, certain media such as those with a high gloss, may not work with the default settings. Before working with such materials, it is necessary to perform a media calibration test. This test will alter OPOS's sensitivity so that it will read the markers with greater reliability.

Perform the following steps to calibrate the media depending on whether the media calibration value is known or unknown:

1. Turn on the cutter and load the media. The load procedure is described in the SummaCut User's Manual.

2. Press the [Menu], then press [<] repeatedly until **SYSTEM SETUP** is displayed.

3. Press [v]. **CONFIDENCE** will appear on the LCD.

4. Press [<] repeatedly until **CAL. MEDIA** appears on the LCD.

4. Press [v]. **MEASURE** will appear.

5. If the media's calibration value is known, press first [>], then [v] on the control panel to set the value manually.

6. Press or repeatedly to set **CURRENT** equal to the known media calibration value. Press and hold either key to scroll rapidly.

7. Press . An asterisk (*) will be displayed to indicate that the new setting has been entered. Changing the setting without pressing will cause the parameter to revert to its previous setting.

8. Press three times to return to the **ONLINE** screen.

UNKNOWN VALUE

1. Print a black square measuring at least 4x4cm on the media that will be used. Be sure to use the same ink that will be used when creating the registration markers.

2. Turn on the cutter and load the media. The load procedure is described in the SummaSign User's Manual.

3. Press the Menu, then press repeatedly until **SYSTEM SETUP** is displayed.

4. Press . **CONFIDENCE** will appear on the LCD.

5. Press repeatedly until **CAL. MEDIA** appears on the LCD.

6. Press. **MEASURE** will appear.

6. Press on the control panel to measure the value.

<<<PUT ON WHITE AREA<<<

7. Click the OPOS sensor into its down position. Use the arrow keys to maneuver the sensor on top of a white area.

8. Press v. OPOS will sense the white area.

<<<PUT ON BLACK PRINTED AREA<<<

9. Use the arrow keys to maneuver the sensor over the bottom right portion of the black printed square.

10. Press v. The cutter will now sense the black area. A value will appear on the LCD.

VALUE 48

NOTE: An error message may appear if the sensor is not able to differentiate between black and white. Make sure that the test has been performed correctly. If OPOS is not able to sense the markers, one of the manual alignment methods must be used (see "Other Alignment Methods").

11. Record the value because it is specific to this kind of media. Then, during subsequent media calibrations, this value may be set manually rather than remeasured.

12. Press x three times to return to the **ONLINE** screen.